REMARKS

Applicants concurrently file herewith an Excess Claim Fee Payment Letter, and corresponding excess claim fee, for two (2) excess independent claims.

Claims 1-18 and 20-27 are all the claims presently pending in the application. Claims 1, 5, 7, 11, 15 and 18 have been amended to more particularly define the claimed invention. Claim 19 has been canceled without prejudice or disclaimer.

Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-8, 11, 13-23 and 25-27 stand rejected under 35 U.S.C. § 102(a) as being anticipated by Tuttle et al. (U.S. Patent No. 6,918,965; hereinafter "Tuttle"). Claims 3, 9, 10, 13-17 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tuttle in view of Robinson et al. (U.S. Patent No. 4,390,392; hereinafter "Robinson"). Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Tuttle in view of Japanese Patent No. JP 401117319A (hereinafter "JP '319").

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention (e.g., as defined by exemplary claim 1) is directed to a method of thermally treating a magnetic layer of a wafer. The method includes annealing, for a predetermined short duration, a magnetic layer of a single wafer, and applying at least one local magnetic field to the magnetic layer.

Magnetic random access memory (hereinafter "MRAM") devices typically undergo a thermal treatment to set some of the magnetic layers in a desired orientation. Generally, the samples are held at a high temperature while a large and uniform magnetic field is applied. A practical difficulty arises when this typical method is applied to a large wafer. That is, large anneal ovens and large magnets are required for treating the large wafers. Additionally, the conventional process is slow, because of the size of the ovens.

The claimed invention of exemplary claim 1, on the other hand, provides a method of thermally treating a magnetic layer of a wafer including applying at least one local magnetic field to the magnetic layer (e.g., see Application at page 7, lines 15-21). This combination of features allows for a fast and local annealing of magnetic stacks (see Application at page 3, lines 20-21). Additionally, magnetic stacks using an exchange-biasing antiferromagnet such as PtMn can be reliably and efficiently annealed in a magnetic field after deposition, in order to align the pinning of the magnetic reference layer (see Application at page 4, lines 15-18).

II. THE PRIOR ART REFERENCES

A. The Tuttle Reference

The Examiner alleges that Tuttle teaches the claimed invention of claims 1-8, 11, 13-23 and 25-27. Applicants submit, however, that Tuttle does not teach or suggest each and every feature of the claimed invention.

That is, Tuttle does not teach or suggest "*applying at least one local magnetic field to said magnetic layer*", as recited in exemplary claim 1, and similarly recited in claims 11 and 18.

The Examiner attempts to rely on the entire disclosure of Tuttle to support his allegations. The Examiner, however, is clearly incorrect.

That is, nowhere does Tuttle teach or suggest a method of thermally treating a magnetic layer of a wafer including applying at least one local magnetic field to the magnetic layer. Indeed, the Examiner does not even allege that Tuttle teaches or suggests this feature. The Examiner merely alleges that Tuttle teaches annealing elements formed on wafers (see Office Action dated August 30, 2005 at page 2).

Tuttle is merely directed to single chip annealing at a heated chuck under the presence of a magnetic field. Additionally, Tuttle teaches applying the magnetic field to the entire wafer.

In stark contrast, the claimed invention recites applying at least one local magnetic field to the magnetic layer. That is, the magnetic field is confined to a specific localized region on the wafer so that the magnetic field can be varied in orientation and strength from one region to another on the wafer.

The localized application of the magnetic field taught in the present Application is much easier to control than the method taught by Tuttle. Additionally, the method of the claimed invention allows a user to set different regions of the wafer at different orientations, which is an advantage to embedded applications of MRAM.

Moreover, Tuttle does not teach or suggest "*heating a local area on the single wafer*", as recited in exemplary dependent claim 3.

Indeed, Tuttle merely teaches heating up the wafer as a whole. The claimed invention allows different regions in a single wafer to be heated separately.

Furthermore, Tuttle does not teach or suggest "*heating said magnetic layer for a duration within a range of about 1 second to about 60 seconds*", as recited in exemplary claim 5. Indeed, Tuttle teaches heating times of about 1 minute to 5 minutes, which results in slower anneal times.

Moreover, Tuttle does not teach or suggest "*annealing multiple separate locations at the same time*", as recited in exemplary claim 15.

Therefore, Applicants respectfully submit that Tuttle does not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

B. The Robinson Reference

The Examiner alleges that Tuttle would have been combined with Robinson to teach the claimed invention of claims 3, 9, 10, 13-17 and 24. Applicants respectfully submit, however, that even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, neither Tuttle nor Robinson, nor any combination thereof, teaches or suggests "*applying at least one local magnetic field to said magnetic layer*", as recited in exemplary claim 1, and similarly recited in claims 11 and 18.

Indeed, as detailed in section A, Tuttle fails to teach or suggest this feature. Furthermore, Applicants submit that Robinson fails to make up the deficiencies of Tuttle.

That is, nowhere does Robinson teach or suggest a method of thermally treating a magnetic layer of a wafer including applying at least one local magnetic field to the magnetic layer. Indeed, the Examiner does not even allege that Robinson teaches or suggests this feature. The Examiner merely relies upon Robinson as teaching that it is known to use point or line annealing to control the application of heat to a wafer.

However, Applicants submit that Robinson is merely directed to laser annealing on silicon wafers. That is, Robinson is directed to the general concept of using a laser for heating a solid material. However, Robinson does not teach or suggest the application of a laser annealing method to a device.

Furthermore, nowhere does Robinson teach or suggest applying at least one local magnetic field to the magnetic layer. Indeed, Robinson does not even teach or suggest using a magnetic field at all.

Thus, Robinson clearly fails to make up the deficiencies of Tuttle.

Therefore, Applicants respectfully submit that these references, even if combined, would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

C. The JP '319 Reference

The Examiner alleges that Tuttle would have been combined with JP '319 to teach the claimed invention of claim 12. Applicants respectfully submit, however, that even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, neither Tuttle nor JP '319, nor any combination thereof, teaches or suggests "*applying at least one local magnetic field to said magnetic layer*", as recited in exemplary claim 1, and similarly recited in claims 11 and 18.

Indeed, as detailed in section A, Tuttle fails to teach or suggest this feature. Furthermore, Applicants submit that JP '319 fails to make up the deficiencies of Tuttle.

That is, nowhere does JP '319 teach or suggest a method of thermally treating a magnetic layer of a wafer including applying at least one local magnetic field to the magnetic layer. Indeed, the Examiner does not even allege that JP '319 teaches or suggests this feature. The Examiner merely relies upon JP '319 as teaching vacuum and nitrogen features for wafer treatment.

However, Applicants submit that JP '319 is merely directed to treatment of semiconductors, without the use of magnets. Indeed, JP '319 does not even mention applying a magnetic filed to a wafer, let alone teach or suggest applying at least one local magnetic field to the magnetic layer.

Thus, JP '319 clearly fails to make up the deficiencies of Tuttle.

Therefore, Applicants respectfully submit that these references, even if combined, would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-18 and 20-27, all the claims presently pending in the application, are patentably distinct over the prior art of

record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

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